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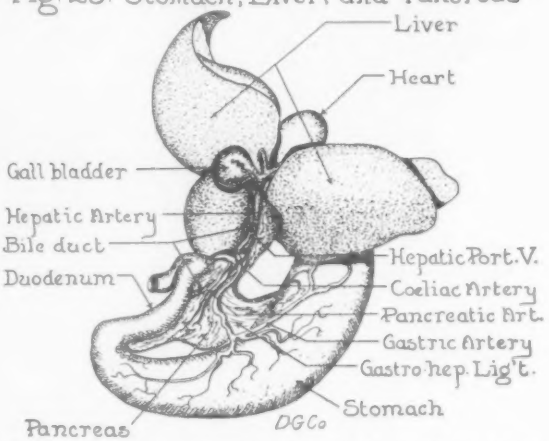

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The American Biology Teacher

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Outdoor Projects in Bird Study

RICHARD LEE WEAVER
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Any study of nature should be fun, and those engaging in it should have enough contact with the real thing to be adequately stimulated. Of all the natural history fields, bird study is probably the most glamorous, the one attracting the most devotees. There are several reasons for this. It is easy to see birds on wing with their many striking colors, to hear the varied songs and calls, and to find their haunts. Attractive stories, pictures and accurate bird song records have made the beginner's an easy one.

Seeing birds in the field is the spark which kindles the fire of enthusiasm. Pictures, specimens, and stories can be little more than poor substitutes if actual field experience is not included in a program of bird study.

Too frequently, bird study field trips are limited to walks where the principal objective is to see as many kinds of birds as possible. Although some of this is desirable in order to build up an acquaintance with the various residents, migrants, and visitors; additional objectives will enhance the study and make it more challenging.

On a field trip, some of the supplementary topics to *What bird is that?*, might be: *Which birds are found in open fields, in marshes, in deep woods? What food is available for the birds? What evidence can you find that birds are controlling insects? How are the different birds adapted for their mode of feeding or of flight?* All of these questions can be answered indoors, but how much more fun it is to look for the answers outdoors. Some of the answers can be found in close proximity to the school. The richer the area in plants and bird life, the richer the experience.

Keeping a class bird migration chart to record the first and last observations of different species is one of the widely used devices to focus attention on birds. It is well to add this additional feature so as to get all of the students observing to some extent. Have a daily or weekly check-up of numbers of birds observed—robins, juncos, chipping sparrows, crows; so that an idea can be had as to when the peak of migration is reached in the various species. The usual method of first and last dates is so selective that

only a few of the better "birders" participate.

Bird nest collections are always difficult to handle in the classroom. Therefore, it is recommended that types of nests be illustrated rather than one for each species. This is best done in the fall after the leaves have fallen. Compare one area with another to see how the various cover types affect bird populations. Keep a record of the trees or shrubs used, the height of the nest, and try to make some generalizations. Compare your results with those in some standard reference. A study of the best food and shelter plants for birds about the school, playground, or community park, with a survey of those present and those needed, would be a valuable conservation project, particularly if you are successful in getting the town fathers to consider the needs of the birds when they are planning and planting. Such trees as the Mulberry, Mountain Ash, Viburnums, Dogwoods, Birches, and Conifers add to the attractiveness of the areas and give the birds food and shelter. Sometimes such plantings can be made in conjunction with a soil conservation project if there is need for preventing soil erosion on a certain slope.

Artificial feeding of birds at trays and windows, while not as valuable as natural feeding through plantings, has merit in getting students interested in the welfare of birds, and in getting them attracted to certain places for observation or pictures. Classes can build and maintain feeders at the school or in the city parks. Regularity and continuity are of primary importance in such a project.

Surveys of possible sites for hole-nesting birds frequently will lead to a desire to make more homes available for such species as bluebirds, tree swallows, crested flycatchers, wood ducks and screech owls. Bluebird housing projects have been particularly popular in some areas. The houses are constructed so that observation of the nests is possible. They are placed along the roads leading from the town or city, as bluebirds prefer open country to the confines of the city itself. Weekly observations are made by groups or teams and records kept of the production of young birds. The competition thus generated will make children keenly conscious of the numerous factors limiting bird populations. Such projects have a high conservational value as so many of the natural sites have been eliminated.

If class time does not permit such outdoor activities, it may be possible to organize a *Junior Audubon Club* or an extracurricular program in natural history. The Junior Audubon Club program with fine descriptive literature and inspiration through group activity lends itself very well to groups just beginning the study of birds. In this early work much of the emphasis is placed on the recognition and observation of birds. Such devices as electrical bird charts will take the interest of children from most of the other activities in the classroom or museum. This type of activity is essential in arousing interest and setting the stage for such projects as those suggested for outdoor work.

Teachers interested in bird study and stressing outdoor experiences need not fear attempting it with a limited background in nature, as there are unlimited references, guides, fieldbooks, pictures, bird song records, to aid anyone willing to try. Some of the best results in teaching have been accomplished where the teacher was learning with the others.

TRUE FLIGHT has developed in three groups of vertebrates; birds, bats, and *Pterodactyls*, or "winged lizards," extinct flying reptiles.

Bird Banding in Secondary Schools

JESSE V. MILLER*
Junior–Senior High School, Manhasset, New York

Everyone should have a hobby. Ever since the first bird was marked, back in 1710, men, women, boys and girls have been banding birds as a hobby, and as an aid to scientific studies. What can they learn from this and what is their purpose? In general, to increase our knowledge of ornithology; in particular, to learn more about the migration, length of life, habits, etc., of certain species through the study of individual birds.

There seems to be general agreement among banders that much more use should be made of bird banding in secondary education. There are many worthwhile objectives within the reach of students who become interested in this phase of bird study. A teacher could aim at the following: 1. To aid the individual in acquiring knowledges and attitudes toward birds which will help him to live a fuller and happier life, 2. To develop those attitudes of mind which enable one intelligently to: a. have a spirit of inquiry (checking work of others, making new studies, etc.) and b. use scientific methods in the solution of problems, 3. To train for the wise use of leisure time, 4. To aid the individual in developing appreciations, such as beauty in the plumages and songs of birds, and the personalities and individualities shown by different individuals and species.

After the instructor has explored the banding field for a while himself, he is ready to introduce students to this thrilling hobby. It can be as part of an existing high school science club, or a new "Bird Banding Club" can be organized. The author has also banded birds before his classes every year for some time, as a means of motivation with excellent results.

Manhasset has attempted to achieve these objectives by means of various tricks of the trade, from units of study in both biology and ninth grade general science to a bird banding club. A constant bombardment of bird experiences in all of my classes without any particular unit organization has also been tried. This takes the form of seasonal bird experiences making use of living specimens as they are brought in. The bird is banded and interesting facts about his life are told or brought out by discussion.

Our bird banding club seems to have been the most successful. Its membership has been of a volunteer nature, hence members consist only of students

FIG. 1. Early spring arrivals renew interests dampened by winter.

* Board of Directors, Eastern Bird Banding Association.

with some original interest. Often this original interest has been created through our unit in general science, or because of the high esteem enjoyed by our group among the student body and parents in the community.

The club is organized with one primary student objective: to encourage research using birds as subjects. The very nature of the enterprise forces us to demand rigid standards of accuracy from our members. In order to become a member each candidate must serve a trial period during which he learns the necessary tricks of banding. If he can do these satisfactorily and fits in with the group, he is voted in and initiated. He then must wear a feather on his head, secured by a red ribbon, and flap like a bird whenever he meets an old member. This goes on for a week, after which the candidate becomes a member in good standing with all privileges of membership, including that of exacting the same initiation from subsequent "unfortunate" victims.

The new member has one year to become a third class bird bander. To earn this advancement, he must serve as a member in good standing for at least three months; be able to demonstrate his ability to perform all banding operations well, know the food types among birds, examples of food used to bait each type, be able to identify 15 or more species of birds in the field, know 5 or more common birds by their songs, and must have banded without help and be able to produce accurate records for at least 10 birds. He is then ready to work for a second class rating.

For this advancement, a member must know 10 birds by song, 20 by sight in the field, band and produce accurate records for at least 25 birds, complete a special study of scientific value using birds as subjects, and know the breeding and winter ranges of at least 5 species.

The highest achievement possible in our club is that which results in the rating of first class bander. In order to achieve this, a member must have a second class rating, have banded more than 40 birds in all; know 35 species by sight, 15 by song; construct and operate a successful trap; make an outstanding contribution to the work of the club by presenting a study involving advanced knowledge of birds, or special detailed observational study.

These studies have proved to be most interesting, and include the raising of nestling birds with complete developmental records; nest studies in the form of daily diaries beginning with the building of the nest whenever possible, and ending when the parents and young can no longer be followed. At present, studies are in progress to determine the types of bird life which occur in greatest abundance in the various sections of Manhasset. A special nest study of a family of Baltimore orioles which nested within 20 feet of a girl member's bedroom window is being supplemented by a winter survey of the number of nests in her region. Other challenging studies have also been undertaken making use of our club records which include about 1500 new banded birds with complete and return records.

The group has been very successful in its publicity work. A full page of activity pictures with comments has been published in a local paper; the group has presented an assembly program before the rest of the school; and regular contributions are made to the bulletin of the Eastern Bird Banding Association, *Ebba Nus*. At present, plans are under way to present lectures before all ninth grade science classes explaining our bird banding work. These lectures will be

illustrated by over 100 Kodachromes which we have taken expressly for the purpose of demonstrating all phases of bird banding.

Boys and girls are equally adept at this banding hobby, and if the club sponsor can keep up his own enthusiasm and provide varied ways of mixing the work of the club with plenty of fun—what a club he can have! Every boy and girl has a job to do. At least two periods per week must be given to the banding work of the club. Each student chooses his own periods from his study halls, noon hours, or after school. In this way, traps are attended throughout the day from 9:00 A.M. to 4:00 P.M. Many unusual species are handled, although the bulk of our birds are common local or migrating species.

All this is really scientific and great sport. Each bander shares his hobby with a couple of thousand other "bugs," all more than anxious to cooperate, or just to talk. There is a banding association in every part of the United States. Many fans belong to these groups which in normal times have local get-togethers and annual meetings. Then too, many banders map their automobile trips so as to visit several active stations while en route.

All banders are licensed by the United States Biological Survey and operate under a special provision of the *Federal Migratory Bird and Mammal Act*. High school students cannot be licensed at present, but they can assist a licensed bander, and there is a good chance that a science teacher can obtain a permit. Wartime restrictions on the use of aluminum for bands have curtailed the work of the Biological Survey, so there is a possibility that a new permit will be difficult to obtain until after the war. Application blanks are obtainable from the United States Biological Survey, Department of Interior, Washington, D. C. A letter of recommendation from a present bander or a well-known ornithologist always seems to help.

FIG. 2. A back-yard banding station at Huntington, L.

The bander furnishes traps, bait and time, while the government furnishes bands and serves as a clearing house for records. No two bands are numbered alike, so each bird has a distinct record. Thus a certain series of bands might run from B-101300 to B-101399. A hundred birds would be recruited into government service by means of this series. These bands are applied to the tarsus of the bird, and come in different sizes to fit different species.

The traps challenge human ingenuity and fascinate those who like to solve puzzles. They must catch birds without causing injury, and be as nearly foolproof as possible mechanically. Considerable experimenting over a period of years has provided us with efficient traps for most purposes. We now use two main types: top opening for those birds which usually approach the trap from the air or over-hanging branches, and ground opening for those birds whose food is normally found on the ground. Nearly all birds drink water, so this is commonly used as bait. In this way over 3,000,000 birds have been banded since 1920.

Birds and Life Zones of the Pacific States

GAYLE PICKWELL
San Jose State College, San Jose, California

The change that is presented in the animal and plant forms in space is brought about largely by two factors: temperature and moisture. Of these temperature is more important than moisture, but moisture greatly affects the plant and animal forms. There is no question but that life varies greatly as one moves from the tropics to the arctics and as one moves from a region of warmth to a region of cold.

It was left for Dr. C. Hart Merriam[1] to reduce this succession of life in space to a critical and scientific basis. He subdivided North America into Life Zones, and divided the north temperate zone into areas much less in extent than the entire zone itself. He premised these zonal divisions on a basis of temperature range through the growing and productive seasons of the year. He divided each zone into a humid eastern and a drier western portion.

One would expect life zone boundaries to extend east and west, since they are based principally on a temperature range, and so they do, but very irregularly and erratically. The irregularity is brought about by the proximity of the oceans and the elevation of the lands, and the great expanse of the interior plains. The Far West presents the life zones in their most dramatic form, and to the Far West this discussion will be restricted.

In the West, because of lessened rainfall, Dr. Merriam called the Lower Austral region and the Upper Austral region the *Lower Sonoran* and the *Upper Sonoran*. The Lower Sonoran Life Zone extends into southern Arizona, occupies nearly all of Lower California, and extensive areas in Mexico and California. In California it occupies the deserts and a long strip north and south through the seasonally hot Sacramento–San Joaquin Valley.

The Upper Sonoran Life Zone in the Far West occurs in many of the valleys of the coast ranges of California, occupies the foothills around the great Sacramento–San Joaquin Valley, most of the coast range mountains, and occurs rather extensively in the dry region of eastern Oregon and Washington.

Life zone boundaries which should run in an east-west direction in the Far West, run chiefly north and south because of the modifications of conditions brought about by the mountains, the Great Valley, and the Pacific Ocean. In no place in North America are temperature ranges as erratic as in the Far West. In this region the great Pacific Ocean modifies the temperature; the mountain ranges enclose the valleys so that these become hot in the growing season; and the mountains themselves present differences in temperature as elevations are attained. As a consequence, the Transition Life Zone in California has been divided by Dr. Grinnell[2] into

[1] MERRIAM, C. HART. *Life Zones and Crop Zones of the United States.* Dept. of Agri. Bulletin, no. 10.

[2] GRINNELL, JOSEPH. *A Revised Life Zone Map of California.* Univ. of Calif. Press.

Wren-Tit at nest. Photo by Gayle Pickwell.

two regions. One is the *Humid Transition Life Zone*, which is that region lying immediately along the Pacific Ocean where the advection sea fogs move from the ocean inland through much of the summer and occasionally even in the winter. The other division of the Transition Life Zone in the California area is the *Sierran Transition*. This portion of the Transition Life Zone is brought about by elevation.

To give a concept of the animal and plant life of these life zones, the typical trees and birds will be named as one passes from the Pacific Ocean to the highest points in the Sierra Nevada mountains. A brief journey will be made into the deserts of California, and then another look will be had at the life zones in the Pacific Northwest.

Charles Dana, in his *Two Years Before the Mast* describes his visit to the Pacific Coast a hundred years ago; and to him the region was chiefly barren, brown, and grass covered. Dana never moved far enough inland to find the startling things which occur there. If he had climbed the first shallow ranges that skirt the sea and gone into the basins behind these ranges where the foot of the sea fogs strikes the ground, he would have seen one of the most impressive sights of the world, the Redwood forest. The Redwoods are the chief indicators of the Humid Transition Life Zone; and this life zone terminates about 50 miles south of the last of the Redwoods which are in the Santa Lucia Mountains of California. Within the zone there are certain very significant birds, such as the Monterey Hermit Thrush, the Pygmy Nuthatch, and the Coast Steller Jay. The Nuttall's

White-crowned Sparrow, found commonly in the Bush Lupin, along the coast, is the typical indicator of this zone; for here it resides, builds its nests, and sings its striking song throughout the year.

Dana, in travelling east would then have come into the Upper Sonoran Life Zone that occupies most of the valleys to the east of the coast range mountains and would have seen as the significant tree of this zone, the Valley Oak. In the foothills of the mountains further to the east he would have found that striking and scraggly tree, the Digger Pine. Having reached the boundaries of the San Joaquin Valley, he would have dropped abruptly into a dry and hot region, that region which is the "rain shadow" of the inner coast ranges. This is a region that in summer is very hot and desert dry. Coming down the foothills to strike the San Joaquin, he would have passed through not only Digger Pine but extensive orchards of Blue Oaks. When in the "rain shadow" of this inner coast range, the trees would have been left behind and Dana would have reached the Lower Sonoran Life Zone.

Perhaps along the water course in the marshy regions of this part of the San Joaquin, the Black Willow would have shown itself and with it great flocks of shore birds nesting in the marsh lands. He would have seen the White-faced Glossy Ibis; atop the shrubs he would have seen the black-masked California Shrike, and the chattering Western Kingbird. (The shrike and kingbird now find much to their liking the fence posts so common in this region today.)

As the lowest portions of the San Joaquin Valley are left in this eastward journey, alluvial fans dropped down from the great Sierra begin to show fingers of a new life zone. This is again the Upper Sonoran, and on these fingers Dana would have seen the magnificent Valley Oaks. Almost the first foothills of the Great Sierra show more trees of the Upper Sonoran. These trees are again the Digger Pine and the Blue Oak. Out from these trees the California Woodpecker undulates showing conspicuous white windows in its wings. Up and down the oaks the Slender-billed Nuthatch climbs. The Upper Sonoran Life Zone of the Sierra Nevada foothills will show some of the typical chaparral covering. Out from this covering the California Jay slides; and that perpetual voice of the chaparral, the song of the Wren-Tit will have been heard. Maybe, too, the California Thrasher would have given its matchless talking song. Dana would have seen the first evidence of the Sierran Transition Zone in extensions of Ponderosa Pines that come down the slopes like long pointed tongues, following the north-facing slopes of the canyon walls. This would have been the "boundary of drama." There is found that striking condition of a life zone that should be higher, occurring below a life zone that should be the lower. Upper Sonoran Life Zonal conditions will occur on the south-facing slopes and on the ridges above the canyon, whereas the north-facing slopes will have the Sierran Transition.

The first of the Sierran Transition Life Zones would have been found on these canyon walls as the mountains were climbed. As our explorer climbs, Ponderosa Pines become conspicuous along with the beautiful Incense Cedar, and the Blue Oak soon gives way to the magnificent Sugar Pines and the White Fir.

The birds now, if it is late June, will be, among many others, the striking Western Tanager or at any time the Blue-fronted Steller Jay. The Sierran

Transition Life Zone is extensive and Dana would have climbed in the latitude of San Francisco, for instance, to an elevation of nearly 7000 feet before he would have reached the next life zone and with it, found other trees or other birds; but at last he would have come to the copses of Quaking Aspens around the high mountain meadows, and would have seen here the world's most magnificent trees, the Red Firs. In the Red Fir he would have heard the matchless song of the Ruby-crowned Kinglet.

At the latitude which our explorer followed, the *Hudsonian Life Zone* would not have been found much short of 9000 feet elevation, but here in the mountain meadows by the copses of White-bark Pine, Lodgepole Pine, and Mountain Hemlock, he would have heard the wailing note of the Clarke's Nutcracker and would have seen its grey and white body. Almost the mountain summits would have been reached before little persistent banks of snow of the *Arctic Life Zone* that is above the trees would have been reached; and here in the land of snow banks, which, at least in a small part are perpetual, would have occurred the last and highest bird of this latitude, the Sierra Nevada Rosy Finch.

The Desert Lower Sonoran Life Zone of California is a region so vast that it is as large as many an eastern state. In the Mohave Desert the typical indicator of this zone is not a tree but the widespread Creosote Bush.

The Colorado Desert, because it is lower, much of it even below the level of the sea, averages hotter than the Mohave Desert—especially is this true in the winter. The forests of the Colorado Deserts are merely large shrubs, but these are beautiful and interesting in a spectacular world. These forms include the Honey Mesquite, the Screwbean Mesquite, the Palo Verde, the Desert Willow, the Desert Ironwood, and the California Fan Palm. This latter tree grows in the canyons about the margins of the desert where streams rush down to lose their lives in the sand. Some typical desert birds are the spectacular Vermilion Flycatcher, the Plumbeous Gnatcatcher, and the complaining Verdin.

The high mountains of the northwest, especially the spectacular old ice cream cone volcanoes of the State of Washington, have a far more extensive region of Hudsonian and Arctic Life Zones than do the mountains of California. These northwest mountains are not only high and precipitous but lie several hundred miles farther to the north than the California Sierras.

The Hudsonian Life Zone of Mt. Rainier is a region of beautiful high mountain park areas. Areas which in July are spectacular fields of grasses of the Alpine tundra, embellished with beautiful flowers. The trees that border these park-like areas are chiefly Alpine Fir. Here, the characteristic bird, Clarke's Nutcracker, is known by its wailing voice. In a dead stump of Yakima Park on the northeast slope of Mt. Rainier, the writer found a Mountain Bluebird nesting; and as the Paint Brush reached its finest flowering condition in late July and early August, the Rufous Hummingbird made flames about them as bright as the blossoms themselves.

The Alpine Fir which grows tall, straight and stately, gives way abruptly to sprawling fir mats as the next life zone is approached. As one reaches the margin of this life zone, these mats disappear entirely and one then enters the realm of the Arctic Life Zone. Instead of one bird species as in the Arctic Zone of the Sierra Nevada Mountains, there are four nesting birds in this region. These are

Hepburn's Rosy Finch, Pallid Horned Lark, White-tailed Ptarmigan and the American Pipit.

The line zonal concept has many critics, and yet no more profound concept of distribution of life has been presented. Some of the criticism arises from the wide distribution of some forms, especially birds, through a series of life zone. In spite of criticisms and exceptions, however, the life zonal concept remains one of the most impressive of all views of the distribution of living things.

BIRDS AND WAR

Are you up to date in your bird study? There are many interesting ways by which birds are being affected by the war. Mention the war training centers for pigeons, how they are being used for messengers. Call attention to the great numbers of birds lost during migration along the eastern coast because of oil from destroyed tankers covering their feathers when the birds alighted to feed. What is happening to the bird populations of Europe and other countries? How do birds affect our gardening efforts? How about the "convoy" system of ducks and geese with their young, or the "power dive" of the hawk, or the camouflage used by so many birds? Much of our war vocabulary is air- and bird-minded. Yes, even our birds have become war-minded!

For mounting collections of bird nests, cut pieces of heavy mounting material or wood for bases about $3'' \times 4''$. Bore small holes in the centers of each. Obtain medium size wire and cut into pieces about 10″ long. Take four pieces and twist together for about 4″. Press the twisted ends into the hole in one of the bases. Spread the other ends of the wire into a cup shape to hold the nest. Label the nest as to identification, location found, and date.

The English Sparrow is one of the few species of birds which feeds its young on seeds and other vegetable matter. Nearly all other seed-eating birds feed their young on insects and other animal matter.

John James Audubon (1785–1851) banded the legs of five young pewees with silver wire, in 1804. The following spring he found some of these birds in the same cave in which he had banded them. This experiment is said to be the beginning of bird banding in the United States.

JUNIOR AUDUBON SOCIETIES

If possible, start *Junior Audubon Clubs* to stimulate bird interest. Have early hikes. Attend bird lectures, movies, etc. Information regarding the Junior Audubon Society may be obtained from *The National Association of Audubon Societies*, 1775 Broadway, New York City. The ten-cent membership includes six bird story outlines containing colored and uncolored bird pictures and a button designating Audubon membership.

Other Audubon Material: Illustrated pamphlets may be had on many subjects that will help with bird study, such as *Field Activities, Winter Feeding, Nature Photography*, etc. Write for their list of aids. There is a small cost for some, others are free.

CHICAGO BIOLOGY ROUND TABLE

The spread of tropical diseases because of the war was brought home strikingly in a talk given by Dr. Carrol Birch, Assistant Professor of Internal Medicine, University of Illinois Medical School, at a regular meeting of the *Chicago Biology Round Table*, which was held at the Top-of-the-Town Restaurant on October 14, 1943. She gave us a surprising picture of the affects that this war is going to have on us as our boys come back from the various fronts. Already we have casualties in our army and naval hospitals which are due to various tropical diseases, two of which are elephantiasis and malaria. The airplane will aid the spread of these diseases unless proper quarantine measures are taken. As one means of counteracting the spread of these maladies because of the war, the armed forces have asked the medical schools to put more stress on the teaching of tropical medicine. To prepare for this, professors of medicine from the various large medical schools were given refresher courses on this subject, which included a trip to the tropics of Central America where they could study actual clinical cases. Dr. Birch was one of these teachers and she convinced the guests at the meeting of the need for a greater knowledge of the cause, prevention and cure of tropical diseases.

A tentative schedule of meetings for the coming year was proposed at this meeting. These dates are: Nov. 12, Dec. 10, Jan. 14, Feb. 11, Mar. 10, Apr. 14, and a Field Trip some time in May.

Florence F. Arenberg
Corresponding Secretary, 1943-1944

ORNITHOLOGY

Here is the Special Issue on *Ornithology*. It has been enjoyable work to be responsible for its editing. The issue is the result of contributions from many parts of the country, and represents many different lines of interest. It is hoped that each reader may find something of practical value. The fine response and cooperation of many contributors show that interest and enthusiasm in Ornithology is widespread even in these busy times.

Betty Lockwood,
Guest editor,
Detroit, Michigan

SOME SUGGESTIONS FOR BIRD STUDY

"Winter or early spring is undoubtedly the best time to begin the study of birds, and late spring or summer the poorest. In winter only the resident species and a few visitants from farther north are about, and the student is less bewildered than when the trees are full of migrants difficult to see because of the dense foliage.

"The almost indispensable equipment for bird study is a notebook and a pair of bird or opera glasses. Any kind of notebook can be used, and the beginner will probably try several before he decides which best suits his particular needs.

"Because of the larger field of vision and greater ease in focusing, most beginners find opera glasses easier to use than the higher-powered field glasses. As observations become more extensive, however, and finer distinctions must be looked for, the need of a stronger glass will be felt. When buying a new glass it is advisable to get one at least six power, with a wide field of vision.

"A pocket guide will be a great convenience. By its use birds may be looked up and identified on the spot, and sometimes it is possible to check the observations and to note special markings, thus making sure of the identification and at the same time impressing the distinguishing characters on the memory.

"Early morning and late afternoon when the birds are feeding and active are the best times for making observations. Even in the summer, birds are usually active until about eleven o'clock and again for about two hours just before sunset. During the day, they are usually quiet and retiring. In winter and early spring, however, they are most active during the warmer part of the day. . . .

"When going afield to watch birds, go alone or with only one or two companions. Speak only in undertones. Avoid light or conspicuous clothing. Move slowly and as quietly as possible avoiding jerky or sudden motions. Stop often and stand still, listening and looking. Have the sun at your back, if possible—when a bird is against the light, it is practically impossible to distinguish its color, and even a scarlet tanager will appear black."

Some Suggestions for Bird Study, U. S. Dept. of Agriculture, Bureau of Biological Survey, Washington, D. C.

Audubon Magazine, formerly *Bird Lore,* merits the careful attention of anyone more than casually interested in birds. Nationwide in scope, it is technically accurate although many of the articles are written in popular style. It is especially known for the excellence of its bird pictures. It is widely available in libraries and every biology teacher should make it a point to familiarize himself with this fine source of teaching material.

The "English Sparrow" belongs to the family known as Weaver Finches, not to the family *Fringillidae,* which includes the native American sparrows and finches.

A Summer Program for Bird Study

OLIN SEWALL PETTINGILL, Jr.
Department of Zoology, Carleton College, Northfield, Minnesota, and University of Michigan Biological Station

"I would like to be able to recognize the common birds and their songs and know something about their habits."

"I would like to develop my interest in bird life so as to become a professional ornithologist."

The above statements have been directed to me on numerous occasions. Generally the first comes to me from persons who have completed their formal education and, now committed to earning a living, have found that a knowledge of birds would either improve the effectiveness of their work, particularly if they are teachers in the biological sciences, or increase their enjoyment of life. Invariably my reply has been, "Spend a summer vacation attending a summer school where ornithology is a recognized course. Such a course should give you at least a working knowledge of birds."

There are many summer schools, nature camps, and biological stations, where summer courses are offered to bird enthusiasts. They are located on sea coasts and shores of inland lakes, in northern woods, among mountains, and on summer-quiet campuses of colleges and universities. The courses naturally vary in requirements for admission as well as in scope and intensity, but they have one characteristic in common,—they are given in places readily accessible by foot or vehicle to country-side and wilderness where birds may be studied under natural conditions.

It is not my intention to discuss here a broad program for summer bird study based on various summer school offerings but rather to outline the program at the *University of Michigan Biological Station*. This program I am most familiar with by reason of the fact that I have directed it for the past seven years.

The Biological Station is located on Douglas Lake in the extreme northern part of the Lower Peninsula of Michigan, a few miles south of the Straits of Mackinac. The topography and vegetation of the area are so varied as to encourage a notable variety of breeding and migrating birds. In the cat-tail marshes, coniferous bogs, virgin and second growth hardwoods, open farming country, and on the sandy shores of numerous inland lakes many bird species of the Canadian and Transition Zones find their respective habitat requirements. On the shores and outlying islands of the adjacent Great Lakes (Huron and Michigan) are several important breeding colonies of water birds and stopping points for shore birds during the late summer migration. Well over 200 different kinds of birds have been recorded in the area as a whole, while during the summer months it is possible to become acquainted with approximately 140 birds.

Of the 130 buildings included in the physical plant of the Station, one (Blanchard Laboratory) is devoted to bird research, and another (Vertebrate Laboratory) serves as a center for regular class work. In these two buildings is housed the ornithological collection comprising some 1150 bird-skins, 500 eggs with nests, and assorted skeletal material. An aviary and a large flying-bird cage for studies of birds under con-

A class in Ornithology examines an abandoned nest of a Long-billed Marsh Wren found in cattail marshes of Indian River, Northern Michigan. Photo by Charles H. Blair.

trol are conveniently located nearby. The Station library contains such adequate reference material as all the important life history and ecological monographs, regional lists of the United States and Canada, extensive runs of the leading ornithological journals, as well as 1500 or more books and papers dealing with bird life.

Our program is organized to meet the two needs: (1) instruction in the recognition of birds and the fundamental principles of bird life; (2) instruction and facilities for the advanced study of birds.

The elementary course is designed to meet the first need by presenting a study of birds in both laboratory and field, the field study receiving the emphasis. For admission, the student must have had two collegiate courses in biology or zoology. One full day each week is devoted formally to the course. And a *full* day it is!

At daybreak the class meets the instructor and assistant at a predetermined spot, traditionally Blanchard Laboratory, and is moved by Station transport to a selected area that has not yet been visited. Once there, the assistant proceeds to prepare the breakfast while class and instructor review the bird calls now at their best in variety and frequency. Breakfast of bacon-and-egg sandwiches and "blackbird" coffee is no sooner consumed than each student prepares for the field quiz by receiving "ballots" (actually slips of blank paper) which he numbers serially and upon each of which he writes his name. Shortly thereafter, Quiz Bird no. 1 (heard on a previous trip) may sing in

the nearby woods. The identification is secretly written on the ballot and deposited in the slot of the box slung from the assistant's shoulder. Quiz Bird no. 2 flies over the road with familiar call and undulating flight; Quiz Bird no. 3 obliges by sitting in plain sight. As these birds are identified, the marked ballots collect in the box accordingly. When a bird not previously seen or heard by the class suddenly appears, or when a nest is found, the quiz is suspended to allow careful observation. Notebooks are whipped out of pockets for the recording of field marks and general information directed by the instructor and various impressions obtained by the students. Customarily the quiz continues until the end of the trip, thus serving the dual purpose of testing the student's field knowledge and keeping him ever alert for seeing and hearing. At the conclusion of the trip each student marks off all species seen or heard, the number of nests and young found, and the estimated number of individuals on a pocket check-list. Here, too, he also notes the weather conditions, time and locality of the trip. When the class boards the transport returning to the Station for lunch, it is the understanding that each student will be held responsible for the future recognition of all species recorded and the remembrance of all data obtained during the morning. Lunch is followed by a rest period that makes up in part for sleep lost in the morning. The remainder of the afternoon is occupied by an hour's lecture and a two hour's laboratory period covering some phase of bird study: external anatomy, life cycles, distribution and migration, plumages and coloration, feeding habits, flight, classification, and economic relationships. Generally the lecture is preceded by a written quiz based on the work of a previous day.

The elementary student is expected to round out his class work by: (1) familiarizing himself with the bird skins that show species characteristics of adult form, color, plumage, and sex; (2) learning the seasonal and zonal status of birds observed in the field; (3) knowing the system of classification to the extent of being able to name orders and families of birds; and (4) compiling in an organized manner all field observations pertaining to each species.

The advanced course in ornithology is designed as a follow-up of the elementary course and is open to students who have had either the elementary course or one of similar intensity. The same amount of time each week is formally devoted to the course, and, again, the emphasis is on field work. The advanced course easily meets the second need of our program by providing opportunity for the experienced student to better his background for eventual professional work.

The class is in the field from sunrise to late afternoon. Trips are planned to cover areas that are likely to contain lesser known birds and to offer favorable chances for observing ecological relationships, making censuses, and recording detailed information on life history habits. Cat-tail marshes, coniferous bogs, and the shores and isolated islands of the adjacent Great Lakes are especially opportune. Lectures, discussions, and demonstrations are held in the field. Elementary subject matter is reviewed and such topics as the following taken up: ecology, censusing methods, systemics and speciation, specific problems involving life cycles, birds of economic importance (chiefly game birds, water fowl, and birds of prey), and the uses of ornithological literature.

A typical class day is the one spent at Black Lake and vicinity. Following

breakfast afield, the class first visits the Great Blue Heron rookery along an uninhabited section of shore. A methodical count is made of the nesting birds, the location of the nests is plotted on a map, and intraspecific relationships are noted. This information is compared at once with data gathered in previous years to show the relative values of such procedures. Then a nearby virgin stand of hardwoods is surveyed, a count being made from the outskirts to the interior. The population of outskirts and interior is immediately compared to show the evident effect of "edge" in governing the numbers of birds. There is time left before a late lunch for a brief trip to a bog lake with a surrounding stand of conifers. Among other things the attention of the class is brought to the succession of bird species from the lake itself to the shore and from the evergreens to the outskirts. The afternoon is devoted to a lecture and discussion of known methods of censusing and a review of external anatomy.

The advanced student is expected to round out his work by: (1) recognizing all the bird skins in the Station collection which represent all species in both young and adult plumage found in the Mid-West; and (2) pursuing an individual piece of field research. In selecting his problem the student is at liberty to take any topic such as a life cycle study, a census of an area, homing methods, an ecological survey, or any phase thereof. He has full use of the Station facilities which include blinds, weighing instruments and measuring devices, traps, cages, and dark rooms for film processing. The student is required to write up his report following the style of current ornithological journals in order to gain first-hand experience in technical presentation.

In addition to regular class meetings, one seminar is held each week for all students enrolled in class work. At least one seminar is devoted to demonstrations and practice in bird skinning and in caring for ornithological collections. Other seminars are devoted to motion pictures of bird life, sound recordings, and reports by investigators.

All students studying ornithology at the station are urgently advised to take courses in associated fields, particularly in systematic botany, mammalogy, herpetology, and entomology. A knowledge of the living environment of birds is as indepensable as a knowledge of bird's relationships to it.

When a student new to the Biological Station enrolls for the first time, he is often heard to remark, "I am taking ornithology and two other courses so I really have only three days of classes. What am I going to do on the other four days?" He finds his query answered for him after his three classes meet. A Biological Station class ends in the late afternoon, *but* the course work continues until the Station closes!

As noted on the staff page in the October issue, our Immediate Past President is at present in the United States Army. His address, at the time of going to press, is Pvt. Homer A. Stephens, Prep. Intelligence School, 18th Repl. Wg. Det., A. A. B., Camp Kearns, Utah.

ELECTION OF OFFICERS

At its recent meeting in Chicago, *The Representative Assembly* voted to conduct the election of officers in the usual way this spring. A nominating committee, with Dr. E. C. Colin, former editor of the journal, as chairman, is at work and it is hoped that biographical sketches of the candidates may be ready for printing in the February issue, as has been customary in the past.

Bird Banding as a Teaching Aid

HAROLD C. BURDICK
Science Department, State Teachers College, Mayville, North Dakota

Bird banding is a technic of bird study which has many possibilities. By marking the individual bird distinctly and keeping the proper records, information is obtained which can be secured in no other way. *The Fish and Wildlife Service* in the Department of the Interior supervises bird banding and keeps the records started by the Bureau of Biological Survey in 1920. Voluntary cooperators have banded more than four million birds, with more than a quarter million return records obtained.

Since 1925, when I had my first experience with bird banding at the station of F. G. Hall, I have come to believe that bird banding should be an effective aid in teaching biology. In the past four years I have had an opportunity to test this belief. The result has been gratifying.

The value of bird banding as a teaching aid may be stated as a parody on an old aphorism: *A live bird in the hand is worth many prepared skins, pictures, field trips, or hours of lectures.* Therefore, the classroom approach has been to bring in live birds and to do banding and releasing before the class. This seems to be a "surefire" method of arousing interest. Questions come—"What kind of bird is it?" "How did you catch it?" "Where did you get the bands?" "Do you ever catch it again?"

To answer these questions offers the opportunity for much specific teaching. A banding permit is passed around and the work of The Fish and Wildlife Service is explained. Bands of various sizes are examined and the proper procedure to use when a banded bird is recovered by a non-bander, is outlined. The second or third time birds are brought to the class, the cage is placed on a table and questions as to what kind of bird it contains are countered by, "How do you suppose you can find out?" The answer is worked out with the class by use of materials such as Reed's two *Bird Guides*, two privately bound volumes containing colored plates and text assembled from the National Geographic Magazine and Chapman's *Handbook of Birds*. Emphasis is placed on the use of keys and technical descriptions instead of pictorial methods of identification. Following this period of instruction, students identify other birds for themselves.

Field trips to the trapping area are equally productive of interest and questions. Consideration is given to the choice of trap sites. The selection of bait to suit the food habits of different species and the attractiveness of water are discussed. Number versus size becomes meaningful in relation to economic importance. The necessity of adequate cover and food in conservation practice is brought out. The students really become aware of migration when they catch birds one day and find most of them gone by the next, or catch a bird that has been banded before.

Individual students are offered an opportunity to help in banding activities. Bird banding is only one of numerous projects which they may undertake during the last term of biology. Some choose to work with hydroponics, chart making, special dissections, or other

topics of interest, so that only those with genuine and exceptional interest select banding. They start out making the rounds of the traps, collecting birds and baiting the traps. Not until they demonstrate many times that they have the identity of a species learned so that there is no confusion with other species, do they perform actual banding. At least ten students have advanced to a point where I could allow them to carry on all operations of the trapping station for several days. Usually they cooperate in some special field trips such as banding bank swallows at night, or placing a trap for chimney swifts on a tall chimney after dark. These trips are popular and students ask to be allowed to go again, even after they are no longer in class.

Each individual undertakes some special study. One sent out a form letter to all banders in the North and South Dakota areas and prepared a summary. This appeared in *The Inland Bird Banding News*. Another tabulated data on dates, weather conditions, band numbers, repeats taken for some 350 white throated sparrows during a migration period; and showed clearly that a few birds stayed here for as long as three weeks, while the majority went through in waves with changing weather conditions. Each student writes up a report to present to other members of the class at the end of the term.

Such members, I believe, have developed a permanent interest in living things. It is my hope that ten–fifteen–twenty years from now several of them will be active cooperators with The Fish and Wildlife Service, helping to achieve an increased activity in this branch of ornithology. After four years of bird banding, I am convinced that any teacher, anxious to enjoy a fascinating hobby, and willing to endure the difficulties of using live wild birds, rather than adhering to a fixed classroom presentation, will find bird banding an important and worthwhile teaching aid.

Recommended Books for Bird Study

Central and Eastern United States

(Many of these references are useful for the entire U. S. The publishers and year are omitted to conserve space.)

When I was asked to make a short bibliography of birds, I thought it would be easy. Then I discovered that there are hundreds of books on every phase of bird life—methods of bird study, taxonomy, migration, nesting, variation of species, foods, feeding habits, songs, stories, molting, fossil birds, houses, nests, eggs, mating, taxidermy, habitats, camera work, birds of every country, state, county, and selected small areas. I decided it was impossible to give a complete list even for one subject. However, each of us has his own pet books to use for special purposes. Here are a few of mine.

Edith Egloff
Hutchins Intermediate, Detroit, Mich.

Allen, A. A., *The Book of Bird Life.*
Allen, A. A., *American Bird Biographies.*
Allen, A. A., *Golden Plover and Other Stories.*
Allen, J. A., *Origin of the Instinct of Migration in Birds.*
Bent, A. C., *Life Histories of North American Birds.*
Brand, A., *Songs of Wild Birds* (2 books, recordings of natural songs).
Chapman, F., *Color Key to North American Birds.*
Chapman, F., *Travels of Birds.*
Chapman, F., *Handbook of Birds of Eastern North America.*

Clarke, W., *Migration* (Maps, Weather Charts, Illust.).
Coues, E., *Key to North American Birds.*
Coues, E., *How to Procure, Prepare and Preserve Birds.*
Forbush, E., *Birds of Massachusetts and Other New England States.*
Forbush and May, *Natural History of the Birds of Eastern and Central North America.*
Herrick, F., *Wild Birds at Home.*
Herrick, F., *Audubon, the Naturalist.*
Lincoln, F., *Migration of Birds of North America.*
May, J. B., *Hawks of North America.*
Pearson, Gilbert, and Other Authors, *Birds of America.*
Peterson, A., *The ABC of Attracting Birds.*
Peterson, R., *A Field Guide to the Birds.*
Reed, C. A., *Guide to Birds East of the Rockies.*
Reed, C. A., *North American Birds' Eggs.*
Roberts, T., *Bird Portraits in Color.*
Saunders, A., *A Guide to the Birds.*
Shoffner, C., *The Bird Book* (More than 500 questions and answers).
Schuyler, M., *Field Book of Wild Birds and Their Music.*
Tippets, K., *Official Emblems.* How, when and why chosen as official emblems.
Weed & Dearborn, *Birds in Their Relation to Man.*
Wetmore, A., *The Migration of Birds.*

Western Birds

Adele Lewis Grant
Science Supervisor for Los Angeles County
University of Southern California, Los Angeles

Bailey, F., *Handbook of Birds of Western United States.*
Dawson, W., *Birds of California.*
Dixon, J., *Common Hawks and Owls of California.*
Finley, W., *American Birds.*
Grinnell, J., *Game Birds of California.*
Hoffman, R., *Birds of the Pacific States.*
Jaeger, E., *The California Deserts.*
Kortright, F., *The Ducks, Geese, and Swans of North America.*
Libby and Bryant, *Bird Study for California Schools.*
McLean, D., *The Owls of California.*
Muir, J., *Mountains of California.*
Peterson, R., *A Field Guide to Western Birds.*
Pickwell, G., *Birds.*
Reed, C., *Guide to Birds West of the Rockies.*
Science Guides for Elementary Schools
Calif. State Dept. of Education
Braun, O., *Domestic Birds.*
Crouch, J., *Winter Birds.*
Pickwell, G., *Birds.*
Traverner, P., *Birds of Western Canada.*
Traverner, P., *Birds of Canada.*
Wyman and Burnell, *Field Book of Birds of Southwestern United States.*

BIRD PICTURES

Audubon Society, 1974 Broadway, New York City. Colored pictures at five cents each.
Bird Lore, Harrisburg, Penn. Back numbers have colored pictures.
Church & Dwight Co., 10 Cedar St., New York City. Bird cards free to teachers, mostly eastern birds.
Dickey, F., Familiar Birds of the Pacific Southwest. 102 pictures, sold separately. Stanford University Press.
DuPont, de Nemours & Co., American Game Birds, 18 plates. $2.00, reduced price to teachers. Wilmington, Delaware.
National Geographic Society, Washington, D. C. Many Colored pictures at a small cost. Send for lists.
Natural History, American Museum of Natural History, New York. See back numbers.
National Museum, Ottawa, Canada. Set of colored postcards of birds (60 for $1.00). Many eastern birds in set.
Nature Magazine, American Nature Association, Washington, D. C. Many back numbers have pictures of birds.

Hawks and Owls—A conservative estimate states that each hawk or owl in a state kills an average of at least 1000 mice a year, saving of at least 20 to 30 dollars to the farmer whose property it selects for its residence. *Are They Vermin?* Cornell Rural School Leaflet, Vol. 31, no. 2.

The voice-producing organ of the bird is the *syrinx*, located at the point where the trachea divides to form the bronchial tubes. It contains a slit-like valve, and muscles for controlling the pitch; as the slit is made narrower the pitch becomes higher. The syrinx is not found in any other animals.

Although migration is characteristic of birds, it is by no means restricted to them. The eels migrate to the ocean for spawning; the salmon move to the headwaters of freshwater streams for the same reason; seals arrive in herds at the Pribilof Islands each spring and remain until early fall; there are many species of migratory insects.

BIRDS AS A HOBBY

GRACE CLARKE
Montpelier, Vermont

(Miss Clarke is one of many who enjoy birds as a hobby. The following is taken from her winter diary kept of the birds that visited at the lunch counter maintained for them. Having a chance to see birds at close vision more than repays one for keeping "open house" to them during the stormy winter months.)

"During the late winter months, redpolls and pine siskins mingled with the rare evening grosbeaks. A few individuals of these species are not uncommon hereabouts, but to see them in such great numbers accepting freely and eagerly of the bird lunch counter, was an unusual and exciting event. 'Cunning' seems to be the fitting adjective to apply to the little red-poll; he is so plump and round, the deep rose-pink of his crown and chest harmonize so perfectly with the brown and grey of the rest of his costume that his whole appearance is very appealing. His manners bear out the impression made by his looks; he is so friendly and unafraid.

"The pine siskin has no brilliant colors to attract one's attention, being small, striped grey and white, and sparrow-like in appearance. But the uncertainty of when you will see him, or if you will see him at all, as eccentricity marks his winter journeyings, makes him the more appealing. Nichols says, 'One had better look and earnestly when he sees his first flock of siskins for it may be many a day before he sees the second.' . . .

"I had long wished that the purple finches would favor me with a visit. This month they did, making me twice glad—glad when they came, and, though I found them interesting to observe, I was glad when they left. The flocks, which arrived early in the morning, were made up of both males and females, but with the females greater in number. The males are handsome creatures with crimson plumage mingled with soft grey and brown. The females have little in looks and less in manners to recommend them, being sparrow-like in color. They were veritable Tartars and shrews. Talk of English sparrows being fighters, they are meek pacifists in comparison with these females. The friendly chickadees who had been with us all winter, hardly dared show their heads at the counter any more, while the peace-loving woodpeckers gave up at once. Not only did they drive away the birds of another species, but very seldom would they allow one of the male finches to get a seed at the counter. These poor, hen-pecked creatures would sit dejectedly on the lilac tree nearby and watch their women folk eat. Just once did I see a male get the best of a female. She had been literally stuffing herself until even the limit of her capacity was reached; so seizing one more seed, she perched on a branch directly below a male. Suddenly he bent down, and like a dart, seized the seed from the mandibles of the astonished lady.

"It was interesting to note that when the finches had had their fill and were ready to depart that they always left one of the females behind, evidently to stand guard. She would sit for long periods on a top branch."

IF YOU ARE INTERESTED in birds in connection with conservation, send for the Conservation Series: Short Age of Waterfowl; Common Hawks of North America; and the Fish-eating Birds. They are 10¢ each. Other materials on Birds and Conservation are free. Write to The Emergency Conservation Committee, 767 Lexington Ave., New York City 21.

SUGGESTIONS FOR SCHOOL ACTIVITIES

BUILDING OF BIRD HOUSES in the manual training classes. (Some towns and cities have annual exhibits of student-made bird houses.)

PLACING OF BIRD HOUSES and bird baths on the school grounds or in the parks.

PLACING AND MAINTAINING winter feeding stations. Have students save seeds of melons, squash, pumpkin, etc. Wash and dry. Collect nuts for winter feeding. Put up suet baskets.

MENU for lunch counter:

Suet, Nuts and Peanut Butter
Sunflower, Hemp, Millet, Cracked Corn and Canary Seeds
Chopped Dog Biscuits and Chick Feed
Doughnut Tidbits, Boiled Potato
Bread Crumbs and Grit

BIRD CENSUS OR bird nest census: divide the area to be covered into sections, assigning students to each section. If searching for nests, make a map of the area, marking the location of nest and its identification.

KEEP A BIRD CALENDAR, keeping track of birds seen by the group, the dates, numbers of birds, etc.

COLLECT BIRD NESTS in the fall. Identify and label. Models of eggs may be made from plaster of Paris. When modeled and dry, they may be painted to duplicate real eggs for the nests. A mold may be made by rounding off the end of a stick of soft wood and pressing into clay. The plaster may then be poured into this mold to shape. When hard, shape the egg with a knife and sandpaper the rough spots.

MAKE A LARGE POSTER resembling a huge clock. Label months in place of the hours. List or place pictures of birds seen during each month in proper place. This will help to act as a census and a check.

WHEN A DEAD BIRD is brought in, make use of it. Mount the feathers from different parts of the body on a large card. The adaptations of the various feathers can be indicated—the long primary feathers for flight, the close-knit breast feathers for protection, etc.

WANT TO IDENTIFY NESTS? An easy help in identification of bird nests east of the Mississippi is *Key to Nests of the Common Summer Resident Birds of Northeastern North America* by A. A. Allen, The Slingerland-Comstock Co., Ithaca, New York.

GREATER CLEVELAND BIOLOGY CLUB

One hundred members and guests of the *Greater Cleveland Biology Club* opened the activities of the year 1943–44 with a dinner meeting, November eighth.

Louis Bromfield, author and conservationist, was the guest speaker. His lecture, *The Paradise Ohio Could Be*, presented the problems of wornout Ohio farms and told of conservation practices which can restore these lands and make them again productive. Drawing from his experiences with farm lands in Richland County, Ohio, conservation problems were made real. Their solution was a fascinating and enlightening story.

The Greater Cleveland Club plans two other meetings for the year. In mid January Mr. John Hibbs of the Agricultural Experiment Station at Wooster, Ohio, will tell of his research work with endocrine glands. On April 19, Mr. Ollie E. Fink, Curriculum Supervisor, Conservation Education, of the Ohio Department of Education and Dr. Jonathan Forman, Editor of the Ohio State Medical Journal, will be guest speakers. Their discussion will deal with conservation, nutrition and human health.

Miss Frances Silliman, Laurel School, Shaker Heights, Ohio, is chairman of the Program Committee. Club officers are:

President, Miss Villa B. Smith, John Hay High School, Cleveland.

Vice President (Senior High Schools), Mr. Earl Bopp, John Adams High School.

Vice President (Junior High Schools), Miss Theresa Dudas, West Junior High School.

Vice President (Elementary Schools), Miss Grace Curry, Chesterfield School.

Secretary, Miss Ann Thompson, Audubon Junior High School.

Treasurer, Dr. V. R. Peterson, Glenville High School.

Miss Nell Henry, Glenville High School, has served as Chairman of the Membership Committee and through her efforts the Greater Cleveland Club now has fifty active members, with chances good for further growth. Dr. V. R. Peterson, the club treasurer, is serving as State Membership Chairman for the National Association.

Respectfully submitted,
VILLA B. SMITH

GOURDS can be made into suitable bird houses by cutting a hole in one side and cleaning them out through the hole. This is somewhat tedious, but results in a "natural" house.

Genes and the Man

By BENTLEY GLASS
Associate Professor of Biology
Goucher College

THE fifth member in the Science in Modern Living Series, *Genes and the Man*, integrates the fields of reproduction, genetics, and growth and development as they relate to human life. Beginning with the single cell, the fertilized egg—our origin—and ending with old age and death, this book is the story of the individual and the factors that make him. Heredity and environment, individual differences, the phenomenon of sex are treated in a comprehensive manner. A wealth of illustrations accompanies the text.

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Books

GLASS, BENTLEY. *Genes and the Man.* Bureau of Publications, Teachers College, Columbia University, New York. xii + 386 pp. Illus. 1943. $3.50.

The author's purpose in writing this book is expressed by him in part as follows: "Throughout the realm of science the narrow, rigid boundaries of specialized fields of subject matter are at least breaking down. The boundary between genetics and cytology has already disappeared, and it is now evident that embryology and physiology are beginning to enter the amalgam. As yet, however, this trend is aparent only in the more technical studies. In general education, compartmentalized biology continues to gain ground. For these reasons this volume has been prepared to indicate a new outlook, not to present genetics, or cytology, or embryology, or physiology, or even a summary of all of them, but rather to describe the operation and interaction of those factors which make the physical man, insofar as we know them or can reason about them today."

Certain topics—cell division, the genetic basis of sex, and embryological development—receive unusually extensive treatment for an elementary work. Some of the theoretical excursions in these sections will be found fairly heavy reading for the average college student. The book shows that thorough scholarship has gone into it. The style is clear and interesting. Much of the material will serve as valuable reading for high school students.

There are numerous well chosen, artistically drawn, and clearly labeled figures, as well as a number of instructive halftones from photographs. The typography, paper, and binding are all of excellent quality. The index of sixteen pages is complete and well arranged.

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a superintendent of schools judged the "author to be not only a master of science but an artist in the use of the English language—the writing is clear and easily understood; in many places it invites re-reading because of its beauty. Like Nature itself, it is a fascinating story."

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